

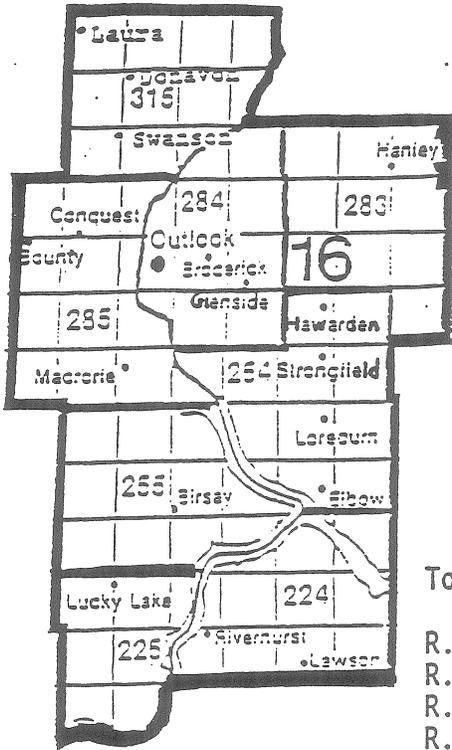
## **THE NEED FOR DEEP TILLAGE**

### **- THE PERSPECTIVE OF THE FARM COMMUNITY**

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EXTENSION AGROLOGISTS ARE OFTEN CONTACTED BY THE FARM COMMUNITY REGARDING THE FEASIBILITY OF DEEP TILLAGE OF PROBLEM SOILS. REPORTS IN FARM MAGAZINES ABOUT SUCCESSFUL DEEP TILLAGE OPERATIONS IN SOME PARTS OF THE PRAIRIES, COUPLED WITH APPARENT INCREASED PRODUCTION ON SOILS FOLLOWING THE INSTALLATION OF PIPELINES, HAVE LED MANY FARMERS TO ENQUIRE ABOUT DEEP TILLAGE IN THEIR AREA. WITH THE ADVENT OF THE POSSIBILITY OF FARMERS RECEIVING FUNDING FOR DEMONSTRATION-TYPE WORK UNDER THE ADD BOARD SYSTEM, A NUMBER OF APPLICATIONS HAVE BEEN MADE REGARDING DEEP RIPPING. IN SOME CASES THE APPLICATIONS INVOLVE SALINE SOILS, AND DEEP TILLAGE IS SEEN AS A "DESPERATE" BUT COSTLY SOLUTION.



### The Need For Deep Tillage

- The Perspective of The Farm Community Enquiries To The Extension Agronomist

District #16 - Outlook is located 100 km south of Saskatoon and the district straddles the South Saskatchewan River and Lake Diefenbaker.

The soils vary from dune sand and Asquith association to Hanley, Rosemae and Tuxford Associations. Among the later soils 138,000 acres are dominant solonetzic and 127,000 acres are significantly solonetzic.

Total: 265,000 acres

- R.M. #283 - 40% of soils are tending to solonetzic.
- R.M. #224 - 24% of soils are tending to solonetzic.
- R.M. #254 - 9% of soils are tending to solonetzic.
- R.M. #255 - Minor amounts.

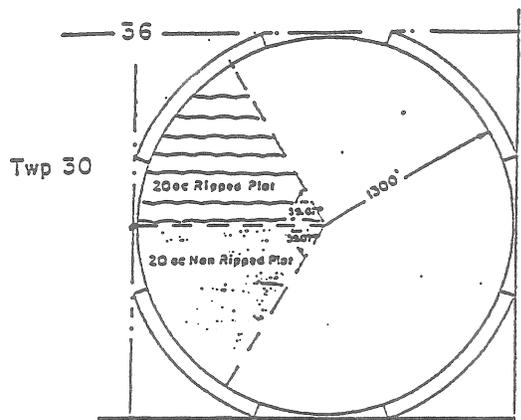
### History of Ripping in District #16

Interest was stimulated in the late 70's, early 80's by farmers observing crop improvements over pipeline and telephone installations.

First demo was NE of Strongfield using a Kelo-build ripper in October, 1981. The soil was solonetzic but with a saline layer below. This was in an area with artesian pressure. The machine left an extremely fractured surface with slabs of soil like smashed concrete. Depth ranged from 2' which brought up salt chunks to 15" - just below the hardpan layer. The soil sealed over in approximately 3 years.

In the fall of 1982 a New Idea 7-tine ripper was rented from Larry Mitchell of Beechy and used to rip 2 fields near Hanley; one on dryland and one on an irrigated site.

The tines on the New Idea were only 3/4" thick and spaced about 18" apart. On dry stubble it did a good job.



The irrigated section (20 acres) was ripped in a pie shape from the centre pivot point to allow for different sized nozzles from centre to outside.

Results from the irrigated test:

1984 - 7 bushels less on ripped (due to poor seedbed);  
1985 - 5.4 bushels more on ripped (77.7 vs 72.3 bushels);  
1986 - 12.0 bushels more on ripped (28.9 vs 16.9 bushels due to  
pivot problem)  
1987 - 5.0 bushels less on ripped (36 vs 41 bushels) - 1/4" showers  
(still pivot problems)

Results from the dryland test:

1984 - 3.7 bushels better for ripped]  
1985 - 6.7 bushels better for ripped] measured at elevator  
1986 - 3.8 bushels better for ripped]

Thanks to Ben Dyck at the Agriculture Canada Station at Swift Current, a paraplow was borrowed and used on 2 test fields at Lawson and NE of Strongfield. The Lawson site was lost due to the death of the co-operant.

Strongfield Site

1986 stubble - 5.6 bushels more on paraplowed  
summerfallow - 7.0 bushels more on paraplowed  
1987 little difference  
1988 droughted out

Other Paraplowing

The Herman Brothers at Bounty paraplowed 1600 acres in 1987. They pumped water from a slough into the fractured soil in the fall and experienced a 15 bushel increase in crop yield the next year.

Thanks to Mike Grevers and the Soils Department for further projects in the district.

Thanks to the staff at the Saskatchewan Irrigation Development Centre for further projects on irrigation.

Thanks to S.O.S. and John Harrington for further dryland projects.

Thanks to ADF for funding for several projects.

Applications for Funding for Deep Ripping Under  
the A.D.D. Board System

Interest in deep tillage in District #16 has grown over the past several years. There are a number of reasons for this. Farmers are generally aware of deep tillage trials carried out by Extension Agrologist and by Mike Grevers of the Saskatchewan Institute of Pedology. News articles in the popular farm press have reinforced the idea, among some farmers, that fuel and steel can "cure" their problem soils. In addition a local implement dealer has made a deep ripper available for a rental fee of \$7.00 an acre. This has prompted a dozen inquiries to the Save Our Soils program concerning use of this machine.

Solonetzic soils present several management problems for producers in the district. These soils can be as productive as any in the district provided rainfall is well distributed over the growing season. Mid-summer droughts of a week or more generally result in lost production. The fields take on an uneven, wavy look. Production and crop maturity across such fields is extremely variable. This makes timing harvest operations difficult.

Optimum timing of other field operations, especially in the early spring, is not easy. Solonetzic portions of the fields can change from being too wet to too dry for optimum tillage in less than a week.

The difficulty of farming these soils, and the significant area affected in District #16 has prompted the district Save Our Soils committee to allow funding of deep tillage projects. It is the committee's opinion that we should attempt to demonstrate better management of the solonetzic soils in the district.

Under our program, farmers receive assistance to cover the cost of equipment rental, the use of their tractor at custom rates, and the cost of any levelling operations to a maximum total of \$1,000.00. The allowable costs in 1990 were typically \$7/acre for ripper rental and \$10-\$12/acre for tractor costs. At this level of assistance, the cooperating farmers would rip from 60 to 80 acres. On each site a check strip was left as a means of demonstrating any differences.

Once an application for deep tillage is received, the site is inspected to determine if it is solonetzic. Once a site is approved, the cooperating farmer is responsible for arranging for the fieldwork.

To date the inquiries for deep tillage can be grouped as follows:

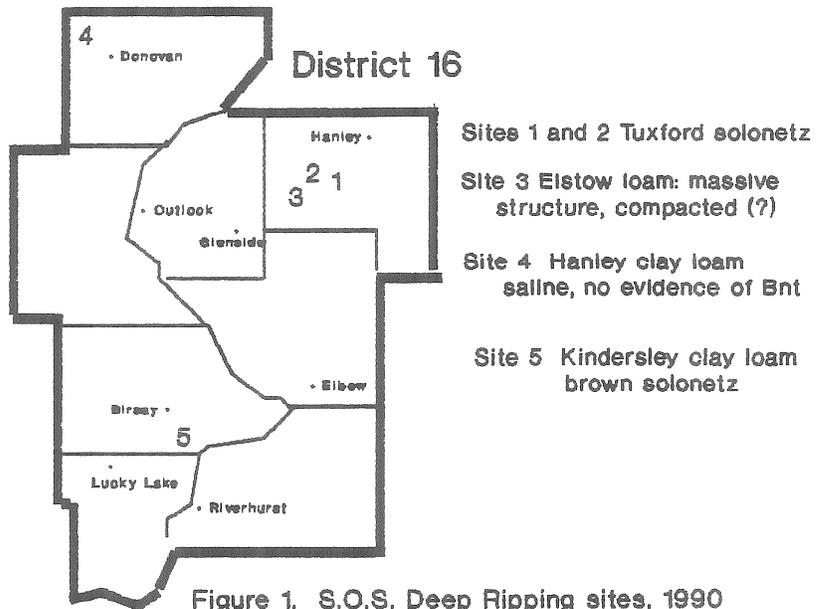
- a) Those who notice "hard spots" in their fields where crop growth is reduced. There is usually some other cause for the problems such as erosive loss of the A and B horizons.
- b) Those who notice a hard subsoil and suspect that it is too dense for root penetration. Usually these sites simply have a dry, calcareous C horizon.
- c) Those who are aware of deep tillage trials in their area and have a reasonable awareness of what a solonetzic soil is.
- d) Those who have "heard" or "read" that deep ripping is a potential cure for saline soil. Often these farmers feel that they have nothing to lose if deep tillage doesn't help.

We find that our knowledge and understanding of deep tillage of our soils is not sufficient to fully answer the inquiries we get. The following information would be of value to us:

- a) Extension material which effectively educates farmers as to where deep tillage is and is not effective. I am convinced that farmers have been misinformed by the farm press and by implement dealers as to the benefits of deep tillage.
- b) Economic analysis of deep tillage on solonetzic soils taking into account the life-span of the benefits and the variations in soil type in many of these fields. Irrigated soils should also be included.
- c) The true solonetz soils in the district often have the Bnt horizon within the top 15 cm of the soil. On some sites it is within 10 cm. Do we have any other options for managing these soils with conventional tillage equipment? Can the Bnt layer be fractured with chisel points or banding knives if field conditions are right?

Figure 1 shows the locations of deep ripped sites funded by the Save Our Soils program. Figure 2 shows an idealized cross section of a ripped field.

The District #16 A.D.D. Board would like to thank Mike Grevers, S.I.P., and Dennis Haak, P.F.R.A., for their assistance with our deep tillage demonstrations



**Stylized cross-section of a ripped field using a Tebben deep ripper, fall 1990**

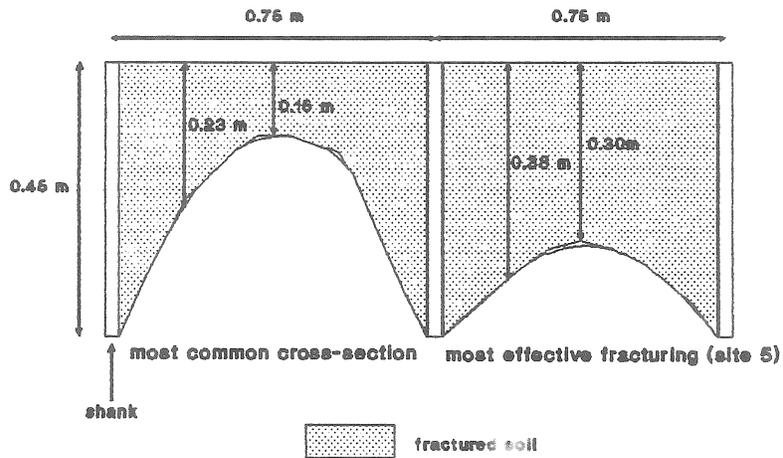


Figure 2. Cross-section of ripped field